CLAIMS

We claim:

1. An immersion fluid comprising: about 10 ppm to a maximum solubility limit of at least one additive selected from an alkyl alcohol or a polymeric alcohol having one or more hydroxyl groups; an alkyl ethoxylate or a propylene (PO) derivative thereof; an alkyl carboxylate or an alkyl acid ester; an alkyl amine having one or more amine groups including primary, secondary and tertiary amines or an alkyl amine ethoxylate; an acetylenic alcohol, an acetylenic diol or ethylene oxide/propylene oxide derivatives thereof; an alkyl polyglycoside; a block oligomer or a polymer of ethylene and propylene oxide; an alkyl sulfate, an alkyl ethoxylate sulfate, an alkyl sulfonate, or an alkyl ethyoxylate sulfonate; an alkyl ammonium salt; a glycidal ether or a glucamine derivative with an alkyl amine, an alkyl diamine, an alkyl alcohol, or an acetylenic alcohol; an alkyl urea or a dialkyl urea; a polysiloxane, a poly(dimethyl)siloxane, a polysiloxane polyester copolymer, or derivatives thereof; a fluorinated or partially fluorinated acetylenic alcohol, diol or derivates thereof; a fluorosurfactant; a salt; and an electrolyte; wherein the salt and the electrolyte have a specific absorbance <1 cm^{-1} at an operating wavelength ranging from 140 nm to 248 nm and a refractive index equal to or greater than water at the operating wavelength, provided that if the at least one additive is a fluorosurfactant then the immersion fluid comprises about 1 % by weight or greater of an aqueous fluid.

2. The immersion fluid of claim 1 wherein the at least one additive is an alkyl alcohol or a polymeric alcohol having one or more hydroxyl groups.

3. The immersion fluid of claim 1 wherein the at least one additive is an acetylenic alcohol, an acetylenic diol, or a ethylene oxide/propylene oxide derivative thereof.

4. The immersion fluid of claim 1 wherein the at least one additive is an alkyl alcohol, an alkyl ethoxylate, or a propylene (PO) derivative thereof.

5. The immersion fluid of claim 1 wherein the at least one additive is an alkyl carboxylate or an alkyl acid ester.

6. The immersion fluid of claim 1 wherein the at least one additive is an alkyl amine having one or more amine groups including primary, secondary and tertiary amines or an alkyl amine ethoxylate.

7. The immersion fluid of claim 1 wherein the at least one additive is an alkyl polyglycoside.

8. The immersion fluid of claim 1 wherein the at least one additive is a block oligomer or a polymer of ethylene oxide and propylene oxide.

9. The immersion fluid of claim 1 wherein the at least one additive is an alkyl sulfate, an alkyl ethoxylate sulfate, an alkyl sulfonate, an alkyl ethoxylate, or an ethoxylate sulfonate.

10. The immersion fluid of claim 1 wherein the at least additive is an alkyl ammonium salt.

11. The immersion fluid of claim 1 wherein the at least one additive is a glycidal ether or a glucamine derivative with an alkyl amine, an alkyl diamine, an alkyl alcohol, or an acetylenic alcohol.

12. The immersion fluid of claim 1 wherein the at least one additive is an alkyl urea or a dialkyl urea.

13. The immersion fluid of claim 1 wherein the at least one additive is a fluorosurfactant.

14. The immersion fluid of claim 1 wherein the at least one additive is a salt.

15. The immersion fluid of claim 1 wherein the at least one additive is an electrolyte.

16. The immersion fluid of claim 1 wherein the at least one additive is a fluorinated or partially fluorinated acetylenic alcohol, diol or derivate thereof.

17. The immersion fluid of claim 1 wherein the at least one additive is a polysiloxane, a poly(dimethyl)siloxane, a polysiloxane polyester copolymer, or derivative thereof.

18. An immersion fluid having a transmission of 80% or greater at an operating wavelength ranging from 140 nm to 248 nm, the immersion fluid comprising:

at least one carrier medium selected from the group consisting of an aqueous fluid, a non-aqueous fluid, and mixtures thereof wherein the at least one carrier medium has a refractive index greater than or equal to water at the operating wavelength; and

about 10 ppm to a maximum solubility limit of at least one additive selected from an alkyl alcohol or a polymeric alcohol having one or more hydroxyl groups; an alkyl ethoxylate or a propylene (PO) derivative thereof; an alkyl carboxylate or an alkyl acid ester; an alkyl amine having one or more amine groups including primary, secondary and tertiary amines or an alkyl amine ethoxylate; an acetylenic alcohol, an acetylenic diol or ethylene oxide/propylene oxide derivatives thereof; an alkyl polyglycoside; a block oligomer or a polymer of ethylene and propylene oxide; an alkyl sulfate, an alkyl ethoxylate sulfate, an alkyl sulfonate, or an alkyl ethyoxylate sulfonate; an alkyl ammonium salt; a glycidal ether or a glucamine derivative with an alkyl amine, an alkyl diamine, an alkyl alcohol, or an acetylenic alcohol; an alkyl urea or a dialkyl urea; a polysiloxane, a poly(dimethyl)siloxane, a polysiloxane polyester copolymer, or derivatives thereof; a fluorinated or partially fluorinated acetylenic alcohol or diol or derivates thereof; a fluorosurfactant; a salt; and an electrolyte; wherein the salt and the electrolyte have a specific absorbance <1 cm^{-1} and a refractive index equal to or greater than water at the operating wavelength, provided that if the at least one additive is a fluorosurfactant then the immersion fluid comprises about 1 % by weight or greater of an aqueous fluid.

19. The immersion fluid of claim 18 wherein the immersion fluid exhibits a dynamic surface tension of about 55 dynes/cm^2 or less at 23°C and 1 bubble/second according to the maximum-bubble-pressure method.

20. The immersion fluid of claim 18 wherein the immersion fluid exhibits a contact angle of about 50° or less at 30 seconds.

21. The immersion fluid of claim 18 wherein the immersion fluid exhibits a specific absorbance of 0.5 cm^{-1} or less at an operating wavelength of 193 nm.

22. The immersion fluid of claim 18 wherein the at least one carrier medium is an aqueous fluid.

23. The immersion fluid of claim 18 wherein the at least one carrier medium is a non-aqueous fluid.

24. The immersion fluid of claim 18 wherein the at least one carrier medium is the mixture of the aqueous and the non-aqueous fluids and wherein the non-aqueous fluid is water miscible.

25. The immersion fluid of claim 24 wherein the non-aqueous fluid is at least one selected from methanol, ethanol, isopropyl alcohol, glycerol, ethylene glycol and derivatives thereof, polyethylene glycol and derivatives thereof, and THF.

26. An immersion fluid having a transmission of 80% or greater at an operating wavelength ranging from 140 nm to 248 nm comprising: at least one carrier medium selected a non-aqueous fluid and a mixture of the non-aqueous fluid and an aqueous fluid wherein the at least one carrier medium has a refractive index greater than or equal to water at the operating wavelength and wherein if the at least one carrier medium is a mixture then the non-aqueous medium is water miscible.

27. The immersion fluid of claim 26 further comprising from 10 ppm to a maximum solubility limit of at least one additive selected from an alkyl alcohol

or a polymeric alcohol having one or more hydroxyl groups; an alkyl ethoxylate or a propylene (PO) derivative thereof; an alkyl carboxylate or an alkyl acid ester; an alkyl amine having one or more amine groups including primary, secondary and tertiary amines or an alkyl amine ethoxylate; an acetylenic alcohol, an acetylenic diol or ethylene oxide/propylene oxide derivatives thereof; an alkyl polyglycoside; a block oligomer or a polymer of ethylene and propylene oxide; an alkyl sulfate, an alkyl ethoxylate sulfate, an alkyl sulfonate, or an alkyl ethyoxylate sulfonate; an alkyl ammonium salt; a glycidal ether or a glucamine derivative with an alkyl amine, an alkyl diamine, an alkyl alcohol, or an acetylenic alcohol; an alkyl urea or a dialkyl urea; a polysiloxane, a poly(dimethyl)siloxane, a polysiloxane polyester copolymer, or derivatives thereof; a fluorinated or partially fluorinated acetylenic alcohol, diol, or derivates thereof; a fluorosurfactant; a salt; and an electrolyte; wherein the salt and the electrolyte have a specific absorbance <1 cm^{-1} and a refractive index equal to or greater than water at the operating wavelength, provided that if the at least one additive is a fluorosurfactant then the immersion fluid comprises about 1 % by weight or greater of an aqueous fluid.

28. The immersion fluid of claim 26 wherein the non-aqueous fluid is at least one selected from citric acid, bicyclohexyl, glycerol, and cis-2-methylcyclohexanol.